Caution:
Please read this Manual thoroughly.
If you do not understand or are unsure of any information contained in this Manual please contact your Agent or BIOQUELL for clarification.

OPERATING MANUAL

ASTEC
MONAIR 5
(TM180-O&M-001)

CE

ASTEC MICROFLOW

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Important, please read this manual before using this equipment.

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1 INTRODUCTION

The Monair 5 fume cupboard has been designed to produce a compact unit that will provide operator safety with an easy to use cabinet.

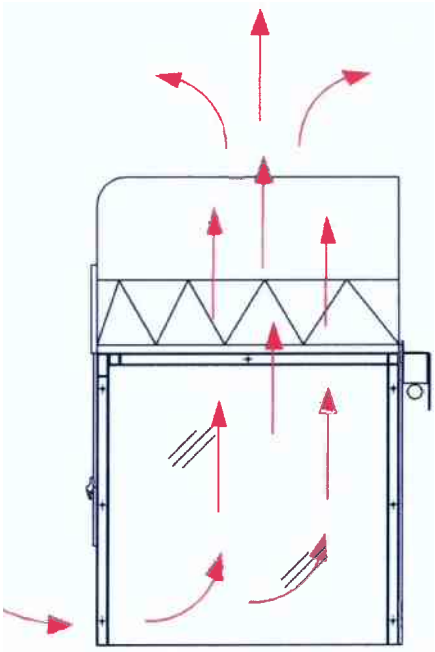


Figure 1 Monair 5 Fume Cupboard Airflow Schematic

The main work area has a face velocity of >0.5 m/s to provide containment of fumes. The optional work surface is polypropylene and will contain spillages. The airflow schematic is shown in Figure 1.

The head unit contains the mains switch, low airflow alarm, carbon filter and lights.

The unit contains 1 x 4 kg carbon filter.

2 INSTALLATION

WARNING:

INSTALLATION SHOULD ONLY BE CARRIED OUT BY TRAINED AND APPROVED ENGINEERS OR AGENTS.

ASTEC MICROFLOW OR ITS AGENTS CANNOT ACCEPT RESPONSIBILITY FOR DAMAGE, LOSS OR INJURY CAUSED BY, OR RESULTING FROM, INCORRECTLY INSTALLED EQUIPMENT.

The units are supplied with an open base and can be positioned over an existing utility such as a sink, or on a balance bench, or can be used with the optional removable spillage tray.

The unit has an electrical plug fitted with a 3 Amp fuse.

Installation of the Monair 5

The Monair 5 base unit is provided flat-packed with the following contents (see Fig. 2):

(1) 2 x side panels with attached legs.

(2) 1 x Acrylic back panel.

(3) Front hinged door panel set.

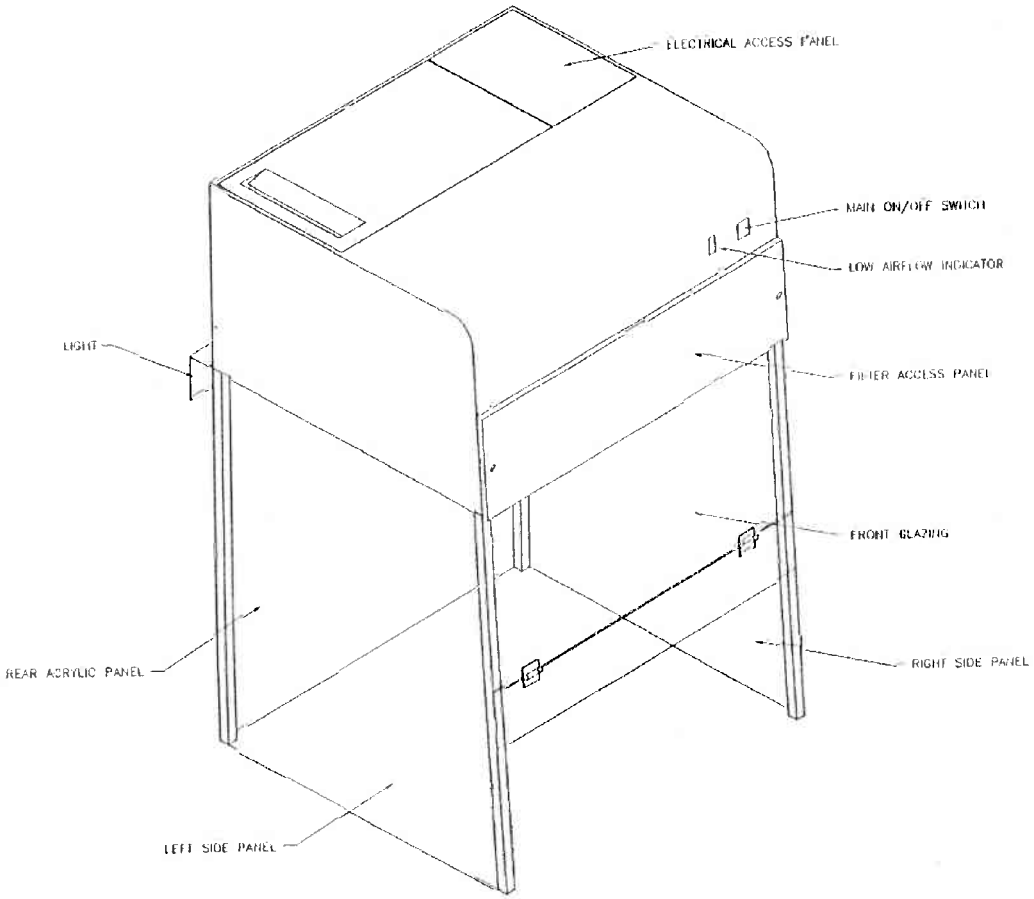


Figure 2 Monair 5 Fume Cupboard Components

Assemble the base as follows:

(1) Screw the acrylic back panel to the side panel legs using four self-tapping screws with nylon washers and black caps provided.

(2) Screw door panel set to side panel legs using self-tapping screws, nylon washers and black caps provided.

(3) An optional joining kit is available to join two bases together. In this case discard the adjacent side panels (with legs), and replace with the n-shaped connecting frame supplied in the kit.

The Monair 5 head unit is provided with the following contents:

(1) Head casing.

(2) Light fitting and electric socket.

(3) 1 x piece of white criss cross ‘egg crate’.

(4) 1 x piece of white Filtrete pre-filter.

(5) 1 x main filter.

(6) 1 x filter clamping bar.

Assemble the Head unit as follows:

(1) Place the head unit on top of the assembled base.

(2) Screw the light fitting to the rear of the head unit using the M5 screws provided, this will secure the head to the base. Plug in the electrical cable in to the socket on the rear of the unit.

(3) Remove the front plate by undoing the 2 x black thumb screws.

(4) Bring the handle on the filter clamp across the unit from right to left to loosen the clamping.

(5) Slide the filter into the unit, with the gasket down on the filter retaining frame. Ensure the filter is properly located.

(6) Clamp the filter by moving the clamping bar from left to right into the unit.

(7) Replace the front cover.

<u>Pre-filter</u>

The pre-filter is located inside of the enclosure on the under side of the head.

(1) Loosen the 2 x M5 screws at the front edge of the head.

(2) Slide the clamping bar towards the front to release the egg crate pre-filter support.

(3) Lay the pre-filter on top of the egg crate and offer it up to the opening, support the assembly and slide the clamping plate back towards the rear of the head, secure the 2 x M5 retaining screws.

3 OPERATING INSTRUCTIONS

A. The fume cupboard may only be operated with the correct filter installed for the application. Refer to sections 9 and 10 of this manual for further information. If in doubt, call Bioquell UK Ltd directly, or contact your local dealer.

B. To start the unit, switch the power switch on. The fan will automatically run to give 0.5 m/s.

C. Check the airflow and filter saturation (if fitted) on a regular basis. Section 6 of this manual describes monitoring systems in greater detail and discusses COSHH requirements.

D. The face velocity at the working aperture (and therefore containment of fumes) is at a maximum with the front lower flap in the closed position. The unit should be used in the closed position whenever practical.

E. A Bunsen burner or other heat source should not be placed too close (<150 mm) to the side or back panels. It is not recommended that an open flame or heat source be positioned closer than 300 mm from the bottom of the filter bed.

F. A polypropylene spillage tray that has good chemical resistance, can be supplied as an option.

G. It should be noted that filter blocks do not absorb carbon monoxide or hydrogen. However small quantities (such as used in schools) will not present a hazard because of the large dilution factor from the airflow through the fume cupboard, and retardation of the chemical in the filter matrix.

H. Astec fume cupboards are designed to handle fumes and vapours given off during normal laboratory procedures. These will be at the ppm level in the airstream entering the filter block. It is NOT recommended that large quantities of solvents or acids should be boiled off in the fume cupboard.

I. Always keep a spare set of filters available.

J. High concentrations of fumes entering the filter block may temporarily reduce the filtration efficiency. For this reason any major spillage within the fume cupboard should be cleared up immediately, preferably using spillage absorption granules, rather than tissue paper which may aggravate the evaporation of toxic fumes from the spillage area.

K. Following a major spillage, the main filters must be changed, as the heat of wetting may reduce filter efficiency. After stabilisation, the old filters can normally be re-used, provided saturation has not been reached.

L. The electrical equipment in the cabinet including light fittings and control equipment are in separate enclosures, on the clean side of the filter. The equipment should not be used in a flammable room atmosphere. Specially modified equipment can be provided for use in solvent rooms. Contact BIOQUELL or your local dealer/distributor for further information.

4 FITTING AND REMOVAL OF FILTERS

Hazards associated with the removal and disposal of used filters will depend on the use to which the filtration fume cupboard has been put. If an activated carbon filter is used with hydrocarbon solvents, the filter will retain the solvents without loss, and can be removed in the open laboratory. A pair of plastic gloves and a plastic bag are supplied with each filter. The plastic gloves should be used when removing filters. The used filters should be placed in the plastic bag and sealed prior to waste disposal, preferably by incineration.

If dangerous materials such as asbestos dust or radioactive chemicals have been contained by the filter, then operator protection which includes the use of respirators and protective clothing may be required. The used filter may require disposal by a specialist company.

As the conditions of use are outside Bioquell UK Ltd control, it is the responsibility of the user to ensure that any personnel changing filters are advised of any potential hazards in handling the filters, and are provided with any necessary protective equipment or clothing. The safety officer in your organization can normally advise.

Changing the Pre-filter

The pre-filter can be changed from inside the unit.

(1) Loosen the 2 x M5 screws at the front edge of the head.

(2) Slide the clamping bar towards the front to release the egg crate pre-filter support.

(3) Remove the pre-filter and place in a plastic bag for disposal.

(4) Lay the pre-filter on top of the egg crate and offer it up to the opening, support the assembly and slide the clamping plate back towards the rear of the head, secure the 2 x M5 retaining screws.

Main Carbon Filter

To change the main filter:

(1) Remove the front plate by undoing the 2 x black thumb screws.

(2) Bring the handle on the filter clamp across the unit from right to left to loosen the clamping.

(3) Remove the old filter and place in a plastic bag ready for disposal.

(4) Slide the filter into the unit, with the gasket down on the filter retaining frame. Ensure the filter is properly located.

(5) Clamp the filter by moving the clamping bar from left to right into the unit.

(6) Replace the front cover.

(7) Re-check the calibration of low airflow alarm and adjust as necessary (refer to Appendix 2).

5 CONTROL PANEL/DISPLAY BOARD (FIG. 3)

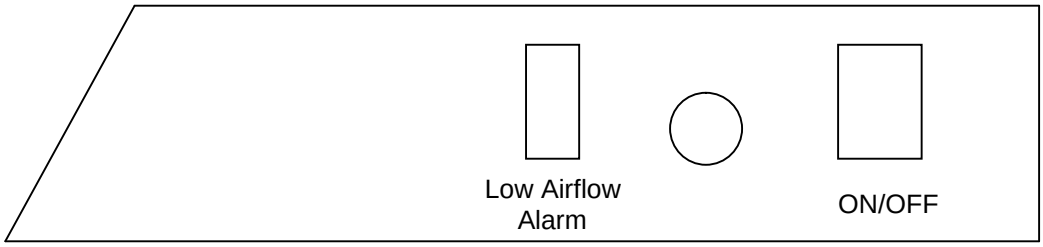


Figure 3 Control Panel/Display Board

MAINS ON/OFF

Press the switch down to switch on. A green indicator lamp will indicate that power is connected to the unit. The fan will run at full speed, ready for normal operation of the fume cupboard and the lights, if fitted, will come on. The cupboard can be used immediately.

LOW AIRFLOW ALARM

The alarm is a red light located at the front of the unit. In normal operation, the red light will not come on.

If the red indicator lamp starts to flash on intermittently or stays on, the pre-filter is starting to block with dust and an airflow reading should be taken at the aperture to determine if the pre-filter requires changing.

The correct operation of the alarm may be tested as described in Appendix 2, instructions on replacing filters are given in Section 4 of this manual.

FILTER STATUS (IF FITTED)

The green LED is constantly displayed while the filter is actively absorbing the chemical fumes. The light goes out every six seconds as the mechanism samples the air stream. When a chemical breakthrough is detected the red light comes on intermittently and an audible alarm bleeps four times every minute showing the filter requires changing. See Appendix 4 for calibration and testing.

6 MONITORING

GENERAL

Under the “Control of Substances Hazardous to Health” (COSHH) regulations, it is mandatory to check safety equipment at “suitable intervals” for correct operation. A suggested maintenance schedule is given in Section 7 of this manual. This section of the manual reviews the manual methods of checking the unit.

The purpose of monitoring is to detect when the pre-filters or main filters cease to operate effectively. If the pre-filters are blocked, the airflow will be reduced at the fume cupboard aperture. If the main filters are saturated, they will cease to remove the fumes effectively.

The Monair units are fitted with a low airflow alarm. Details for testing and calibration are in Appendix 2.

A Manual check of the filters ought to be carried out once every three months as described below whether the filter saturation has been fitted or not.

If an odour is noticed, it is sensible to check the fume cupboard. However, it must be remembered that the sense of smell is very sensitive for some chemicals (e.g. ammonia or hydrogen sulphide) and a slight smell does not mean that the exhaust levels of chemical have approached the maximum acceptable concentration.

MANUAL MONITORING

Manual monitoring should be carried out yearly to check the integral systems on the unit.

Airflow Measurements

An anemometer should be used to check the airflow (face velocity) at the working aperture, with the lower panel down. Any suitable anemometer may be used, including hot wire, propeller or vane anemometer. A minimum of six readings should be taken across the working aperture. Note the result in a record book kept for this purpose. This is mandatory under COSHH regulations. We advise changing the pre-filter if the average airflow drops below 0.5 m/s.

The pre-filters will normally need to be changed more frequently than the main filters. A blocked HEPA filter (where fitted) is also indicated by reduced airflow which is not restored after a pre-filter change.

Manual Filter Saturation Detection

1. Select a suitable test chemical and matching Gastec sampling tube. Examples include alcohols, toluene, trichloroethylene, or any suitable chemical in routine use in the fume cupboard, provided it is well adsorbed and is not dangerously toxic.

2. Place 3 ml of chemical in a beaker on a hotplate. Adjust the hotplate to boil off the chemical in about two minutes. This gives a concentration of about 100 - 200 ppm to challenge the filter.

3. For testing ACI filters (acid adsorbing), use sulphur dioxide gas (SO_2) at 1 bubbles per second through water.

4. Using the Gastec tube, sample the outlet airstream from the unit, following the instructions given with the Gastec tube (one pump stroke for trichloroethylene, eight pump strokes for sulphur dioxide for example).

5. The reading should be below the Occupational Exposure Limit (see Section 10). Enter the result in a record book kept for this purpose. This is mandatory under COSHH regulations.

6. If a significant level of chemical is noted in the exhaust air, the main filter should be changed.

7 MAINTENANCE

IMPORTANT NOTICE

Under the "Control of Substances Hazardous to Health" (COSHH) regulations, effective from 1st October 1989, it is mandatory to maintain written records of checks, tests and repairs carried out on safety equipment, and these records must be kept for 5 years. A summary of COSHH Regulations are provided in Appendix 1.

Regular maintenance will reduce the possibility of hazard to the operator and prolong the life of the unit.

WARNING:

BEFORE ATTEMPTING ANY INSPECTION OR REPLACEMENT OF ELECTRICAL COMPONENTS IN THE ASSEMBLY, ALWAYS ISOLATE THE UNIT FROM THE MAINS ELECTRICITY SUPPLY.

Airflow

The Monair units are fitted with a low airflow alarm. With this model you should test the alarm once a year as described in Appendix 2 of this manual, to ensure it is operating correctly.

Filter Saturation

The Monair units do not have a filter saturation detection system fitted as standard however the option is available. The filter condition should be monitored regularly, whether the saturation detection system has been fitted or not, i.e. every 3 months or more frequently if required.

Cleaning and Inspection

You should carry out the following procedures at six monthly intervals:

1. Remove the spillage tray (where fitted) and wash in dilute detergent solution.
2. Wash the interior surface of the cupboard with dilute detergent solution.
3. Inspect the cupboard frame and panels for mechanical damage.
4. Inspect the hinged door for corrosion and correct adjustment of friction hinges (where fitted).

The following checks should be made every 12 months:

1. Check the condition of services to the cupboard, including water supply, drip cup, waste drain (where fitted), gas supply (where fitted) and electric cable and plug.
2. The electrical earthing and insulation should be inspected by a qualified electrician.
3. Check the fan for correct running.

8 TROUBLE SHOOTING

WARNING:

BEFORE ATTEMPTING ANY INSPECTION OF ELECTRICAL COMPONENTS IN THE ASSEMBLY, ALWAYS ISOLATE THE UNIT FROM THE MAINS ELECTRICITY SUPPLY.

Electrical components are mounted behind the control panel. Access to the electrical components is gained by removing the grill on top of the head, undoing the six retaining screws and sliding the control panel out.

Some possible problems and their causes are shown below:

1. Unit will not operate, no lights or airflow:
   - (a) Check that unit is plugged in and switched on.
   - (b) Check fuse in mains supply or plug (where fitted).
   - (c) Check fuses in electrical input socket.
2. Unit operates, but the fluorescent light does not come on.

   Disconnect the electrical connection and remove the two screws holding the light box on.
   - (a) Ensure light tube correctly seated.
   - (b) Replace starter lamp.
   - (c) Replace fluorescent tube.
3. Fan does not operate.
   - (a) Change motor start capacitor on fan. Access to fan is by removing the plate on top of the unit.
   - (b) Motor failure - contact Astec or your local distributor for advice.
4. Fan operates initially, but then cuts out.

   Motors are fitted with a thermal cut-out device, which will operate if the motor temperature rise exceeds 95°C. The most likely cause of overheating is a blockage of the airflow, either at the filters or at the exhaust outlet at the top of the unit. Low airflow alarm will operate.
5. Low airflow light - the red indicator lamp comes on at switch on and stays on.
   - (a) The filter is not sealed correctly in the head unit. Check the filter gasket is sealing correctly.
   - (b) The fan has failed.
   - (c) The alarm is malfunctioning - See Appendix 2.
6. Low airflow light - the red indicator lamp comes on at switch on, goes off, then comes on again.
   - (a) The pre-filter is blocked with dust.

(b) If replacement of the pre-filters does not cause the red light to stay off, then the low airflow alarm requires recalibration, as described in Appendix 2.

FOR FURTHER ADVICE PLEASE CONTACT BIOQUELL UK LTD.

9 FILTER TYPES

PRE-FILTERS

Filtrete pre-filter. This is a high performance pre-filter, designed to remove particulates from the airstream. The filter material is based on electrets, which are permanently charged di-electrics. They remove particulates from polluted air by strong electrostatic forces generated by the fibres from which they are made.

The combination of strong electric charge and open structure provides a filter with high efficiency, low airflow resistance and high loading capacity. Measured efficiency figures for particles in the 0.5 - 2.0 micron range is 99%, with loading capacities up to 113 g/m². Filtrete will remove fine particles, aerosols and mists.

MAIN FILTERS

Fourteen different types of filter media are available for the main filter bed. Most of these are impregnated activated carbon, to provide a higher filter capacity for lower molecular weight organic compounds and inorganic gases and vapours. A number of filter efficiency studies have been carried out, and all results using single bed filters show efficiencies very close to 100%.

1. GP Filter. The most widely used filter in the range, primarily for solvent fume removal. It is manufactured from coconut-shell based activated carbon of 5-10 mesh size and surface area up to 1300 m²/gm. Filtration is achieved by the physical adsorption of molecules in the pores of the activated carbon by Van de Waals forces. This filter will remove any chemical with a molecular weight greater than 30 and a boiling point greater than 60°C.

2. ACR Filter. This filter is impregnated with halide salts, and is used for the high efficiency removal of radioactive iodine and methyl iodide. It is frequently used for iodination reactions with low-level radioactive iodine, and efficiencies in excess of 99.99% have been measured.

3. ACM Filter. This filter is impregnated with iodine compounds for removal of mercury vapour. The filter has been demonstrated to remove mercury from a saturated airstream at ambient temperature to below 5 parts per billion (ppb) in the exhaust airstream.

4. AMM Filter. This filter is impregnated with copper compounds to efficiently remove vapour from dilute ammonia solutions, and to remove low molecular weight amines.

5. ACI Filter. This alkali-impregnated filter will neutralise volatile inorganic acid vapours such as hydrochloric and hydrofluoric acids, and acid gases such as sulphur and nitrogen dioxides.

6. SUL Filter. A potassium iodide impregnated filter, designed to remove hydrogen sulphide and low molecular weight mercaptans.

7. CYN Filter. A multi-impregnated filter to a military specification, for removal of hydrogen cyanide gas. Many cyanide compounds will evolve HCN gas if

acidified, so this filter is normally specified if working with any cyanide compound.

8. FOR Filter. This filter is impregnated with an oxidising agent to oxidise formaldehyde to formate salts. It is widely used in hospital pathology laboratories.

9. ETH Filter. Diethyl ether is adsorbed on activated carbon, but because of its low boiling point, the local heat of adsorption can reduce the capacity of the filter. Special impregnation allows a chemical reaction which increases filter capacity.

10. MIL Filter. As the name implies, this filter is multi-impregnated to handle a wide range of chemicals defined by the Ministry of Defence. It will efficiently remove solvent fumes, acid fumes, hydrogen sulphide, cyanides and arsine at high efficiency (>99%) but has a somewhat reduced capacity compared to single impregnated filters. It contains noble metals.

11. OAL Filter. This odour filter is normally used in air purifiers to deal with odours from excreta, urine and other materials essentially alkaline in nature.

12. OAC Filter. Air purifier odour filters for human and animal acid type smells caused by bacterial decay, such as cadaverine and putrescine, and other odours which are acidic in nature.

13. HEPA Filter. The High Efficiency Particulate Air filter is a pleated glass-fibre material sealed with epoxy resin in an aluminium frame. Each filter is tested to ensure a stated particulate filtration efficiency (usually 99.997%) according to US Standard 209B or BS 3928. A HEPA filter is sometimes known as an absolute filter.

14. EDU Filter. The EDU filter has been specially formulated to adsorb the normal range of chemical fumes generated in Schools during GCSE and 'A' level classes.

Advice is available from BIOQUELL UK LTD.

10 UK OCCUPATIONAL EXPOSURE LIMITS 2000

The updated Occupational Exposure Limits are available on www.hse.gov.uk/coshh/table1.pdf

The exposure limits are expressed in parts per million by volume (ppm) under the following headings:

(a) LTEL - Long Term Exposure Limit (8 hour time weighted average reference period).

(b) STEL - Short Term Exposure Limit (15 minute reference period).

Gastec or Dräger sampling tubes are available for most chemicals.

11 CHEMICAL APPLICATIONS

INTRODUCTION

The table overleaf gives a list of common laboratory chemicals, together with the filter recommended and an estimate of filter capacity.

The recommended filter is the main single-layer filter used for the application. It may be possible to use other filters, such as the MIL filter or a Multi Layer filter. In all cases the filter efficiency for a single layer filter will be close to 100%. Chemicals marked * are poorly absorbed by all filters and should be used in small quantities only. Their exhaust concentration may however be quite low due to dilution with air and retardation in the filter matrix.

The filter capacity is given as the equilibrium saturation capacity, a standard test procedure for activated carbon (ASTM-D3467). The capacity is expressed as the final filter weight at saturation as a percentage of initial filter weight. In many cases these values have been determined by experiment, in other cases estimated values are used based on experience with activated carbon material and a knowledge of the chemical structure. The actual capacity obtained will depend on the conditions of use, but the breakthrough point to reach the OEL of the chemical may be up to 70% of this value for normal input loadings.

Chemical	Filter Type	Equilibrium Saturation Capacity %
Acids		
Acetic	GP	33
Acetic anhydride	GP	33
Acrylic	GP	40
Butyric	GP	40
Caprylic	GP	40
Carbolic	GP	40
Formic	ACI	20
Lactic	GP	40
Osmium tetroxide	GP	40
Palmitic	GP	40
Phenol	GP	40
Proprionic	GP	40
Valeric	GP	40
Alcohols		
Ethyl	GP	32
Amyl	GP	40
Butyl	GP	40
Cyclohexanol	GP	45
Isopropyl	GP	40
Methyl (methanol)	GP	32
Propyl	GP	40
Aliphatic Hydrocarbons		
Acetylene	GP	20
Iso-butane	GP	10
Butylene	GP	10
Butadiene	GP	-
Cyclohexane	GP	35
N-decane	GP	-
Ethane *	GP	-
Ethylene *	GP	-
N-heptane	GP	-
Heptylene	GP	-
Hexane	GP	35
Hexylene	GP	-
Methane *	GP	-
N-nonane	GP	-
N-octane	GP	-
N-octylene	GP	-
Pentane	GP	26
Propane *	GP	-
Propylene	GP	10
Aromatic Hydrocarbons		
Benzene	GP	40
Napthalene	GP	47
Ninhydrin	GP	47
Styrene monomer	GP	47
Toluene	GP	47
Toluidine	GP	47
Xylene	GP	40
Esters		
Butyl acetate	GP	40
Cellosolve acetate	GP	45
Ethyl acetate	GP	40
Ethyl acrylate	GP	45
Ethyl formate	GP	40
Isopropyl acetate	GP	45
Methyl acetate	GP	40
Methyl acrylate	GP	45
Methyl formate	GP	40
Methyl methacrylate	GP	45
Aldehydes and Ketones		
Acetone	GP	32
Acetaldehyde	FOR	10
Acrolein	GP	32
Benzaldehyde	GP	40
Butyraldehyde	GP	32
Caproaldehyde	GP	40
Crotonaldehyde	GP	40
Cyclohexanol	GP	40
Diethyl ketone	GP	32
Dipropyl ketone	GP	40
Formaldehyde	FOR	10
Gluteraldehyde	FOR	10
Mesityl oxide	GP	40
Methyl butyl ketone	GP	40
Methyl ethyl ketone	GP	32
Methyl isobutylketone	GP	40
Propionaldehyde	GP	32
Valeraldehyde	GP	40
Valeric aldehyde	GP	40
Ethers		
Amyl	GP	35
Butyl	GP	35
Cellosolve	GP	40
Dioxan	GP	45
Diethyl (ethyl)	ETH	10
Ethylene oxide	GP	20
Isopropyl	GP	25
Methyl cellosolve	GP	45
Methyl *	ETH	10
Propyl	GP	30
Halogens		
Bromine	GP	53
Butyl chloride	GP	40
Carbon tetrachloride	GP	65
Chlorine	GP	20
Chlorobenzene	GP	53
Chlorobutadiene	GP	40
Chloroform	GP	60
Chloro picrin	GP	65
Chloro nitropropane	GP	60
Dibromoethane	GP	60
Dichlorobenzene	GP	60
Dichlorodifluoro methane	GP	20
Dichlorodifluoro ethane	GP	40
Dichloroethylether	GP	53
Dichloromethane	GP	53
Dichloromonofluoro methane	GP	20
Dichloropropane	GP	53
Dichlorotetrfluoro ethane	GP	20
Ethyl bromide	GP	20
Ethyl chloride	GP	20
Ethylenechlorohydrin	GP	40
Ethylene dichloride	GP	53
Fluorotrichloro methane	GP	50
Freon (BP > -20°C)	GP	45
Hydrogen bromide	ACI	5
Hydrogen chloride	ACI	5
Hydrogen iodide	ACI	7
Iodine	GP	55
Iodoform	GP	53
Methyl bromide	GP	25
Methyl chloride	GP	20
Methyl chloroform	GP	45
Methylene chloride	GP	45
Monochlorobenzene	GP	45
Fluorotrichloro methane	GP	45
Paradichlorobenzene	GP	45
Perchloroethylene	GP	45
Phosgene	MIL	20
Propyl chloride	GP	40
Tetrachloroethane	GP	53
Tetrachlorotheylene	GP	53
Vinyl chloride	GP	20
Sulphur Compounds		
Carbon disulphide	GP	20
Dimethyl sulphate	GP	50
Ethyl mercaptan	SUL	40
Hydrogen sulphide	SUL	20
Mercaptans-high MW	SUL	40
Sulphur dioxide	ACI	10
Sulphur trioxide	ACI	20
Sulphuric acid	ACI	40
Tetrahydrothiapene	GP	40
Nitrogen Compounds		
Acetonitrile	CYN	20
Ammonia	AMM	10
Amines - low MW	AMM	10
Amines - high MW	AMM	40
Aniline	GP	40
Diethyl amine	AMM	20
Diethyl aniline	GP	53
Dimethyl amine	AMM	20
Ethyl amine	AMM	20
Hydrogen cyanide	CYN	20
Indole	GP	53
Nicotine	GP	40
Nitric acid fumes	ACI	10
Nitrobenzene	GP	53
Nitroethane	GP	53
Nitrogen dioxide *	ACI	-
Nitroglycerine	GP	53
Nitromethane	GP	40
Nitropropane	GP	40
Nitrotoluene	GP	53
Pyridine	AMM	53
Urea	GP	53
Uric acid	GP	53
Miscellaneous		
Adhesives	GP	40
Animal Odours	OAL	30
Camphor	GP	40
Carbon monoxide *	GP	-
Carbon dioxide *	GP	-
Citrus fruits	GP	40
Cooking odours	GP	40
Deodorisers	GP	20
Detergents	GP	40
Hospital odours	OAC	30
Human odours	OAC	30
Leather	GP	30
Ozone	GP	30
Nicotine	GP	30
Perfumes	GP	30
Petrol	GP	40
Putrescine	OAC	30
Resins	GP	30
Toilet odours	OAL	30

12 SPECIFICATION

AIRFLOW

Volume of air treated	200 m^3/hr
Average face velocity	>0.5 m/s
Lighting	1 x 15 W

Low Airflow Alarm Fitted

FILTERS

Main 4 kg (1 off)	450 x 450 x 40 mm

SIZE

Width	600 mm
Depth	580 mm
Overall height	800 mm
Internal working height	500 mm
Weight	37 Kg

CONSTRUCTION

Head and base	Epoxy coated mild steel frame and head unit.
Colour	Grey
Back Panel	Clear acrylic
Side Panels	Clear acrylic
Front doors	Clear acrylic
Spillage Tray (optional)	Polypropylene
Fan	Centrifugal type

ELECTRICAL

Voltage Supply	230 V, 50 Hz, Single phase or 120V, 60Hz Or 100V 50/60H²
Switches	Mains On/Off
Fuses	2 x 3 Amp
Power rating	Max. 90 Watts
Current Drawn	0.4amps at 230V 0.8amps at 120V/100V

OPTIONS

1. Polypropylene work surface tray.
2. Filter saturation alarm

ENVIRONMENTAL CONDITIONS

Indoor use only
Temperature 10°C to 35°C
Maximum relative humidity 80%.
Main supply voltage fluctuations not to exceed ±10% of nominal.
Pollution degree 1.

APPENDIX 1 - NOTES ON COSHH REGULATIONS (UK ONLY)

1 The "Control of Substances Hazardous to Health" (COSHH) regulations, effective from 1st October 1989.

2 The regulations are the UK implementation of an EEC Council Directive 80/1107/EEC.

3 The regulations require an employer to protect his employees and any other people (whether working for him or not) from hazardous substances.

4 A hazardous substance is defined as:

(a) A substance which is on the list of hazardous substances as defined by the Classification, Packaging and Labelling Regulations 1984 (b).

(b) A substance for which an Occupational Exposure Limit (OEL) value exists. This list is similar to US Threshold Limit Value levels (TLV).

(c) A micro-organism which creates a health hazard.

(d) Dust at a substantial concentration in air.

(e) Any substance which creates a hazard to health, similar to the hazards created by the substances in (a) to (d).

Note:
Paragraph 4 (e) is a "catch-all" section.

5 The employer is responsible for assessing the risk to an employee.

6 The employer must prevent or control the exposure of an employee to hazardous substances.

7 The control of exposure "shall be secured by measures other than the provision of personal protective equipment". This means the fumes must be contained, rather than providing protective suits and masks to staff.

8 OEL values must not be exceeded.

9 The employer must ensure that safety equipment is properly used.

10 The employee must use safety equipment provided correctly.

11 The employer must maintain safety equipment in good working order; in particular:

(a) Exhaust ventilation equipment must be examined every 14 months.

(b) Other safety equipment must be examined at "suitable intervals".

(a) Records of checks, tests and repairs must be kept for 5 years.

12 Monitoring of exposure to hazardous substances must occur "in accordance with a suitable procedure". Records of results must be kept for 5 years for general monitoring and for 30 years when they relate to a specific employee.

13 Regular medical checks are required when working with certain listed substances, or where an identifiable disease is associated with a certain substance.

14 An employer must provide suitable instruction and training to employees regarding risks of substances and precautions to be taken.

15 Certain other regulations take precedence, such as Control of Lead at Work, Control of Asbestos at Work, radioactive, explosive or flammable regulations, Mines and Quarries Act, and medical treatment regulations.

APPENDIX 2 - CALIBRATION

TESTING THE LOW AIRFLOW ALARM

WARNING:

CALIBRATION OF THE PRESSURE SWITCH INVOLVES CONTACT WITH THE MAIN BOARD WHICH HAS ELECTRICAL CONTACTS AT MAINS VOLTAGE. CARE SHOULD THEREFORE BE TAKEN WHEN CARRYING OUT THE CALIBRATION PROCEDURE.

1. Ensure that new a pre-filter is fitted in your filtration fume cupboard. Switch on the unit, indicator lamp should be out.
2. Switch off the unit. Remove the pre-filter, wrap in a plastic bag and replace flat in the filtration unit. Switch on. The red indicator lamp will start to flash.
3. If a malfunction is indicated by steps 1 or 2, then a pressure switch calibration procedure may be required. Details are provided below. Remember to remove the plastic bags from the pre-filters before returning the unit to routine use

CALIBRATION PROCEDURE

The low airflow alarm operates using a differential pressure switch. The pressure switch detects a “high vacuum” situation caused by a blocked pre-filter. The pressure switch is carefully calibrated before leaving our factory, and in the majority of cases calibration will not be required.

The factory calibration is carried out using a standard GP filter at 240, 220 or 110 Volts 50 or 60 Hz mains supply, depending on the market area. Standard Filtrete pre-filter is used. If the end-user is known then the calibration will be performed using the correct main filter in place.

In some cases it may be necessary to recalibrate the pressure switch on site for the following reasons:

1. A severe knock during transport.
2. A change in the mains voltage or frequency.
3. Use of a different main filter from the used during factory calibration.

The pressure switch is located behind the control panel.

The pressure switch is located in the electrical panel on the top right hand side of the head unit.

The filtration fume cupboard should be fitted with main filter and new Filtrete pre-filter. Switch on and wait 30 seconds to warm up.

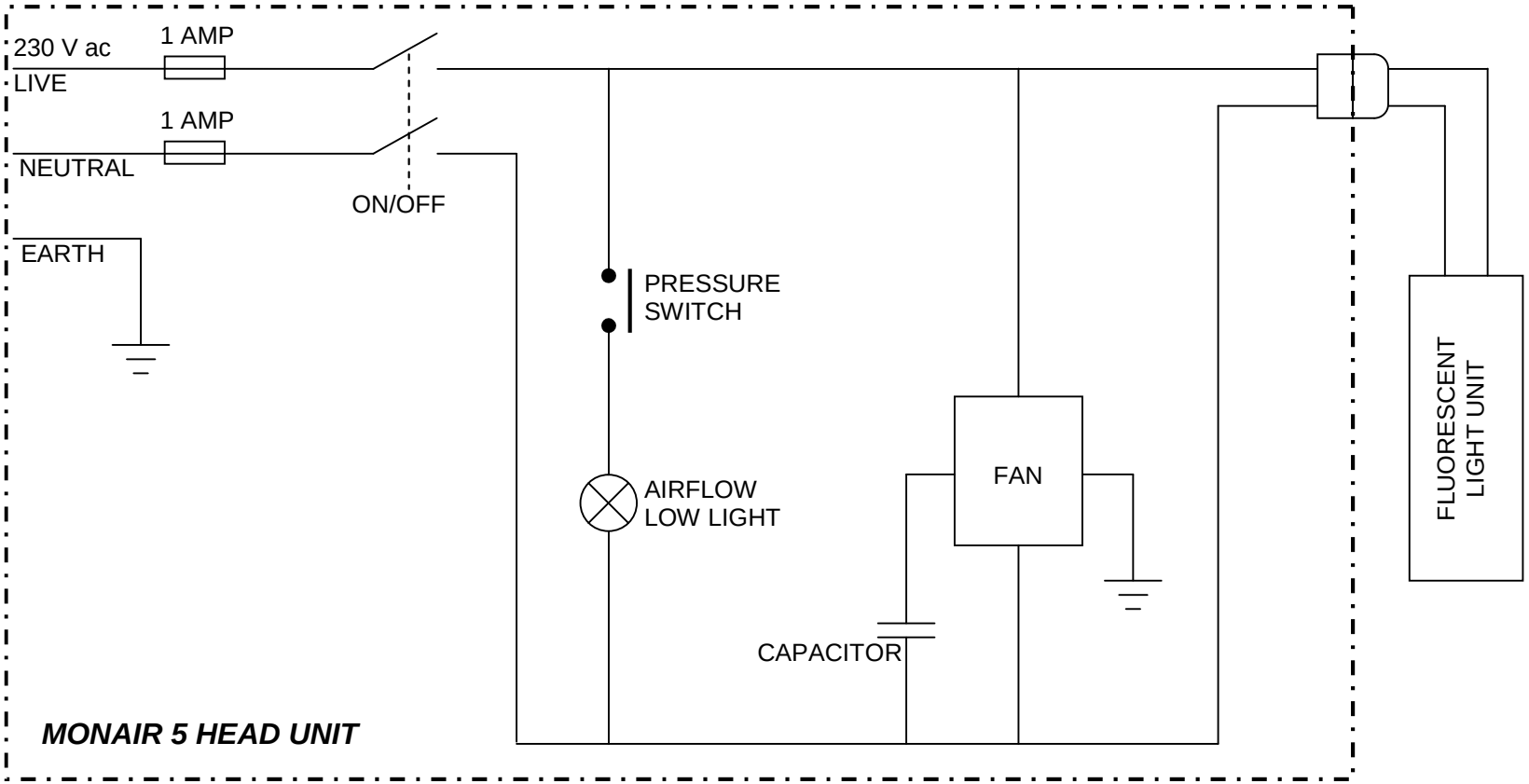
1. Unscrew (anticlockwise) switch by 2 turns. The red warning light should now be off.
2. Screw switch clockwise until the red warning light JUST comes on.

3. Unscrew switch by 5 degrees (half an hour on the HOUR hand of a clock) so the red warning light goes out.

4. Check calibration by switching the unit off, and wrap the pre-filter in a plastic bag and replace flat in the unit. Switch on. The warning light should come on.

It should be noted that the alarm is NOT an ON/OFF device, but will start to flicker as the pre-filter progressively blocks with dust.

APPENDIX 3 - ELECTRICAL DIAGRAM



APPENDIX 4 - TESTING AND CALIBRATING THE FILTER SATURATION ALARM

TESTING THE FILTER SATURATION ALARM

1. Switch on the unit, the green indicator lamp comes on.
2. Release the filter clamp.
3. Place a small amount of alcohol (isopropanol) on a tissue and hold above the filter to introduce the fume into the airstream. The red indicator lamp should come on and the audible alarm sound.
4. If a malfunction is indicated by steps 1 or 2, then a calibration procedure may be required. Details are provided below. Remember to remove the paper before returning to routine use!!

CALIBRATION - FILTER SATURATION BOARD

The detector has been set up in the factory before delivery. However the unit may require a slight adjustment in some environments.

1. Take the cover off the electrical enclosure.
2. The sensor board is located in the top left hand corner.
3. The adjustment potentiometer is located on the centre left hand side of the board.
4. Using a small screwdriver or adjustment tool, turn the potentiometer clockwise to desensitize or anticlockwise to increase sensitivity.

APPENDIX 5 - PROTOCOL FOR TESTING, MONITORING, REPLACEMENT AND DISPOSAL OF FILTERS

1 BEST PRACTICE

In order to clarify best practice for the use of carbon filters Astec Microflow would like to recommend the following guidance. This guidance is primarily for Carbon filters but High Efficiency Particulate (HEPA) filters are referred to when appropriate.

2 FILTRATION

Carbon filter technology has been safely applied for the absorption of harmful vapours and fumes for many years. However, there still exists some doubt with users as to the best practice with regard to filter monitoring and changing. Astec Microflow has detailed best practice in the following product group Tables 1, 2 and 3. Each of these tables express recommended test monitoring and change periods in months, (assuming a 40 hour working week).

3 TEST PROTOCOL - TERMS

The test period is the maximum period between the filter installation test and the next test for fume bypass of the filter, in some applications where heavier loads of chemicals are applied or the chemicals are dangerous then filter testing should be completed weekly or monthly.

The monitoring period is the maximum period between the filter installation test and the regular weekly/monthly filter monitoring for fume bypass.

The change period is the maximum period between the filter installation and the time to change the filter.

All the test, monitor and change periods are expressed in months. Therefore, in units of higher usage the month recommendation will be superseded by the earlier number of hours.

Note:
The test, monitor or change should be completed at the earliest point whether this be, for example, 6 months or 1000 hours which ever is sooner.

4 CARBON FILTER LIFE

It is important to note that once the sealed bags containing carbon filters have been opened they will absorb water from the atmosphere. Therefore after 24 months the filters potential life cannot be assured and should be replaced.

The filter test protocol should be applied during all test, monitoring, and filter change stages. The protocol is to confirm that the filter is correctly fitted and is absorbing the fumes intended.

Filters ought to be tested 6 monthly, monitored 9 monthly and changed 12 monthly.

Months to Hours conversion

1 month = 175 hours
3 months = 500 hours
6 months = 1000 hours
9 months = 1500 hours
12 months = 2000 hours

Note:
Use the shortest time scale that applies.

5 FILTER TEST PROCEDURE

After installation or when test or monitoring is required the following procedure should be completed:

(a) Ensure the unit is switched on and confirm the airflow is correct by measurement or examination of the low airflow alarm.

(b) Introduce the chemical challenge that is normally in use within the unit or a less harmful equivalent for example Iso Propyl Alcohol (IPA).

(c) Test the exhaust or the filter test port to confirm there is no evidence of the chemical.

If the chemical has been detected then the following checks should be completed.

This test can be simply carried out using Gastec or Draeger detector tubes and the appropriate hand held pump. Test pumps and tubes can be supplied by Astec Microflow.

(d) Note for some chemicals the chemical tube technique is not the best method for measurement. For example, Gluteraldehyde should be tested using OSHA 64 (American standard) method for accuracy.

Notes:

1 Ensure the filter is correctly fitted with the seal seated and compressed.

2 Ensure that there are no gaps in the filter seal.

3 Change the filter and retest.

4 If the chemical by pass continues contact your agent, service provider or Astec Microflow.

6 FILTER DISPOSAL

HEPA and Carbon filters must be disposed of safety in accordance with local legislation and regulations.

APPENDIX 6 – CARE AND CLEANING

1 STAINLESS STEEL COMPONENTS

Considerable care has been taken in the selection and processing of the stainless steel components used in the construction of this equipment, however even stainless steel can be damaged by chemical attack.

It is therefore important to ensure that any cleaning or disinfecting procedures used will not cause a chemical attack that may damage the surface of the stainless steel. Work surfaces should be kept clean and free of chemical liquids, particularly those containing Chlorine.

Liquids or vapours containing Chlorine are known to cause gradual staining of stainless steel. To avoid this, when chemicals are used containing Chlorine all surfaces should be thoroughly dried and all traces of the solution removed, the area should then be treated with a neutralising agent. Open vessels left inside the equipment which are likely to cause Chlorine vapours may also result in staining of the metal surfaces.

Should the surface of the stainless steel become stained, it may be cleaned by mechanical polishing and special treatment of the affected area. Our service department can help with this process.

2 PLASTIC COMPONENTS

Cleaning of the plastic items should only be carried out with mild detergent or chlorine based cleaning solutions. Care must be taken not to apply chlorine solutions to any stainless steel metalwork, as this will potentially cause staining.

Do not apply heat, abrasive materials, solvents or solvent wipes to the surface as this can cause irreparable damage.

3 PAINTED AND OTHER COMPONENTS

Caution:
Do not use water around electrical connections, switches etc.

To clean all painted and other components use a damp cloth and, when required, a liquid detergent.

Note:
Do not use abrasive cleaners or chlorine based cleaning products.

APPENDIX 7 CE CERTIFICATE

EC DECLARATION OF CONFORMITY FOR ATTACHMENT OF 'CE' MARK

CE

We, the manufacturer: BIOQUELL UK Limited.
52 Royce Close
Portway Industrial Estate
Andover, Hampshire
SP10 3TS
Tel: +44 (0) 1264 - 835835
Fax: +44 (0) 1264 - 835836

Declare under our sole responsibility that the appliance:

Monair 5 Recirculatory Fume Cupboard

Serial Number as stated on Certificate of Factory Testing

Complies with the Protection Requirements of the Electromagnetic Compatibility Directive 2004/108/EC and the Machinery Directive 2006/42/EC by means of the following harmonised standard:

BS EN 61326-1 : 2006

Tested By: TRaC, Holly Grove Farm,
Verwood Road, Ashley, Ringwood, Hants, BH24 2DB –
Certificate No. 6620/09

Other harmonised standards used:

EN 61010 : 2001

Responsible Person :-

Name :- ***O.R.Cumberlege***

Position :- ***Director***

Signed:- _____

Date:- 10th March 2010 .

APPENDIX 8 WARRANTY INFORMATION

BIOQUELL UK Ltd. produces products that are warranted under normal usage against defects in workmanship and materials for one-year parts and labour costs, from the date of manufacture. The Warranty is stated in the Standard Terms and Conditions of sale.

Export and Agent retailed products are warranted directly by the Agent. Please confirm your warranty and liability status with the Agent.

In addition, the Warranty is void unless the following conditions are met:

(a) The product has been installed and used as stated within the Instruction Manual.

(b) **The warranty does NOT include servicing or maintenance.** An approved service company who have attended our training courses for your product must carry out maintenance of product. Failure to maintain or service this product will invalidate the warranty. Maintenance must be carried out in accordance with the Service Manual and include tasks within stated periods. Failure to use approved service companies or BIOQUELL UK Ltd. trained personnel for maintenance also affects the CE Marking status of the product, removing BIOQUELL's Duty of Care and responsibility

(c) Consumables such as: pre-filters, main filters, light bulbs and tubes, not warranted.

(d) This Warranty is void if faults are caused by accidental damage, mishandling, adjustment by unauthorised personnel or failure to follow the correct maintenance and safety precautions as stated in the Instruction Manual.

(e) The Warranty expressly provided for herein is the sole Warranty provided in connection with the product and no other Warranty, expressed or implied, is provided. BIOQUELL UK Ltd. assumes no responsibility for any other claims, consequential (including lost time or profit) or other damage, whether based in contract, tort or otherwise, not specifically stated in this Warranty.

(f) Except in respect of death or personal injury caused by Seller's negligence, or as expressly provided in these Conditions, Seller shall not be liable to Buyer by reason of any representation (unless fraudulent), or any implied warranty, condition or other term, or any duty at common law, or under the express terms of the Contract for any loss of profit or any indirect, special or consequential loss, damage, costs, expenses or other claims (whether caused by the negligence of Seller, its servants or agents or otherwise) which arise out of or in connection with the supply of the Goods or their use or resale by Buyer, and the entire liability of Seller under or in connection with the Contract shall not exceed the price of the Goods.

Note:
When requesting a Warranty visit, please have the following information available:

(i) Product model number and name.

(ii) Serial number.

(iii) Date of last service, and Service Company.

(iv) Nature of fault and any other comments likely to indicate cause of fault.

(v) A Purchase Order number to cover costs incurred if visit is outside the scope of the Warranty.

BIOQUELL UK Ltd., or other nominated personnel will carry out warranty visits.

(g) In the event of any health and safety incidents please advise us in writing at the earliest opportunity.

(h) This warranty and all other contractual issues shall be governed by English law and the parties agree to submit to the nonexclusive jurisdiction of the courts of England.